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IN THE CLAIMS:

Please amend the claims as indicated.

1. (Previously Presented) A torque sensor, comprising:

a sensor element,

wherein the sensor element is manufactured by applying a first current pulse to the sensor element, the first current pulse being applied in such a manner that there is a first current flow in a first direction along a longitudinal axis of the sensor element; and

wherein the first current pulse is such that the application of the first current pulse generates a magnetically encoded region in the sensor element,

wherein a second current pulse is applied to the sensor element; and

wherein the second current pulse is applied in such a manner that there is a second current flow in a second direction along the longitudinal axis of the sensor element;

wherein the sensor element has a circumferential surface surrounding a core region of the sensor element;

wherein the first current pulse is introduced into the sensor element at a first location at the circumferential surface such that there is the first current flow in the first direction in the core region of the sensor element;

wherein the first current pulse is discharged from the sensor element at a second location at the circumferential surface; and

wherein the second location is at a distance in the first direction from the first location

wherein the first current pulse is applied using an electrode system having at least a first electrode and a second electrode; and

wherein the first electrode is located at the first location and the second electrode is located at the second location

wherein each of the first and second electrodes has a plurality of electrode pins; and

wherein the plurality of electrode pins of each of the first and second electrodes are arranged circumferentially around the sensor element such that the sensor element is

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contacted by the electrode pins of the first and second electrodes at a plurality of contact points at an outer circumferential surface of the shaft at the first and second locations.

2. (Cancelled)

3. (Previously Presented) The torque sensor of claim 1,

wherein each of the first and second current pulses has a raising edge and a falling edge; and

wherein the raising edge is steeper than the falling edge

4. (Previously Presented) The torque sensor of claim 1,

wherein the first direction is opposite to the second direction

5. (Cancelled)

6. (Previously Presented) The torque sensor of claim 1,

wherein the second current pulse is introduced into the sensor element at the second location at the circumferential surface such that there is the second current flow in the second direction in the core region of the sensor element; and

wherein the second current pulse is discharged from the sensor element at the first location at the circumferential surface.

7. (Previously Presented) The torque sensor of claim 1,

wherein the sensor element is a shaft;

wherein the core region extends inside the shaft along its longitudinal extension such that the core region surrounds a center of the shaft;

wherein the circumferential surface is the outside surface of the shaft; and

wherein the first and second locations are respective circumferential regions at the outside of the shaft.

8. (Cancelled)

9. (Previously Presented) The torque sensor of claim 1,
wherein the first current pulse has a first maximum between 40 and 1400 Ampere.

10. (Previously Presented) The torque sensor of claim 1,
wherein the first current pulse has a first maximum between 60 and 800 Ampere.

11. (Previously Presented) The torque sensor of claim 1,
wherein the first current pulse has a first maximum between 75 and 600 Ampere.

12. (Previously Presented) The torque sensor of claim 1,
wherein the first current pulse has a first maximum between 80 and 500 Ampere.

13. (Previously Presented) The torque sensor of claim 9,
wherein a second maximum of the second pulse essentially corresponds to the first maximum.

14. (Original) The torque sensor of claim 3, wherein a first duration of the first current pulse is significant longer than a second duration of the second current pulse.

15. (Previously Presented) The torque sensor of claim 14,
wherein the first duration is smaller than 300 ms; and
wherein the second duration is larger than 300 ms.

16. (Previously Presented) The torque sensor of claim 14,
wherein the first duration is smaller than 200 ms; and
wherein the second duration is larger than 400 ms.

17. (Previously Presented) The torque sensor of claim 14,
wherein the first duration is between 20 ms to 150 ms; and

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wherein the second duration is between 180 ms to 700 ms.

18. (Cancelled)

19. (Cancelled)

20. (Previously Presented) The torque sensor of claim 1,

wherein the sensor element is made of steel.

21. (Previously Presented) The torque sensor of claim 20,

wherein the steel includes nickel.

22. (Cancelled)

23. (Cancelled)

24. (Previously Presented) The torque sensor of claim 1,

wherein at least one of the first current pulse and at least one of the second current pulse are applied to the sensor element such that the sensor element has a magnetically encoded region;

wherein, in a direction essentially perpendicular to a surface of the sensor element, the magnetically encoded region of the sensor element has a magnetic field structure such that there is a first magnetic flow in a first direction and a second magnetic flow in a second direction; and

wherein the first direction is opposite to the second direction.

25. (Previously Presented) The torque sensor of claim 1,

wherein in a cross-sectional view of the sensor element, there is a first circular magnetic flow having the first direction and a first radius and a second circular magnetic flow having the second direction and a second radius; and

wherein the first radius is larger than the second radius.

26. (Previously Presented) The torque sensor of claim 1,

wherein the sensor element has a first pinning zone adjacent to the first location and a second pinning zone adjacent to the second location.

27. (Previously Presented) The torque sensor of claim 26,

wherein, for forming a first pinning zone, one of at the first location and adjacent to the first location, a third current pulse is applied on the circumferential surface to the sensor element such that there is a third current flow in the second direction; and

wherein the third current flow is discharged at a third location which is displaced from the first location in the second direction.

28. (Previously Presented) The torque sensor of claim 26,

wherein, for forming a second pinning zone, one of at the second location and adjacent to the second location, a fourth current pulse is applied on the circumferential surface to the sensor element such that there is a fourth current flow in the first direction; and

wherein the fourth current flow is discharged at a forth location which is displaced from the second location in the first direction.

29. (Previously Presented) A torque sensor, comprising:

a first sensor element with a magnetically encoded region, the first sensor element having a surface,

wherein, in a direction essentially perpendicular to the surface of the first sensor element, the magnetically encoded region of the first sensor element has a magnetic field structure such that there is a first magnetic flow in a first direction and a second magnetic flow in a second direction, the first direction being opposite to the second direction,

wherein the first sensor element has variations in a material of the first sensor element caused by one of at least one current pulse and surge applied to the first sensor element for altering the magnetically encoded region

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wherein in a cross-sectional view of the first sensor element, there is a first circular magnetic flow having the first direction and a first radius and a second circular magnetic flow having the second direction and a second radius, the first radius being larger than the second radius.

30. (Previously Presented) The torque sensor of claim 29, further comprising:

a second sensor element with at least one magnetic field detector, the second sensor element detecting variations in the magnetically encoded region.

31. (Previously Presented) The torque sensor of claim 29,

wherein the magnetically encoded region extends longitudinally along a section of the first sensor element, but does not extend from one end face of the first sensor element to the other end face of the first sensor element.

32. (Cancelled)

33. (Previously Presented) The torque sensor of claim 31,

wherein the variations are at an outer surface of the sensor element and not at the end faces of the first sensor element.

34. (Previously Presented) The torque sensor of claim 29,

wherein the first sensor element is made of steel.

35. (Original) The torque sensor of claim 34,

wherein the steel includes nickel.

36. (Cancelled)

37. (Previously Presented) The torque sensor of claim 29,

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wherein the magnetically encoded region of the first sensor element has first pinning regions adjacent to end regions of the magnetically encoded region.

38. (Previously Presented) The torque sensor of claim 29,

wherein the first sensor element is a shaft.

39. (Previously Presented) A method for magnetically encoding a sensor element for a torque sensor, comprising:

applying a first current pulse to sensor in such a manner that there is a first current flow in a first direction along a longitudinal axis of the sensor element, wherein the first current pulse is such that the application of the current pulse generates a magnetically encoded region in the sensor element; and

applying a second current pulse to the sensor element;

wherein the second current pulse is applied such that there is a second current flow in a second direction along the longitudinal axis of the sensor element,

wherein each of the first and second current pulses has a raising edge and a falling edge, the raising edge being steeper than the falling edge.

40-46. (Cancelled)

47. (Previously Presented) The method of claim 39,

wherein the first current pulse has a first maximum between one of 40 and 1400 Ampere; 60 and 800 Ampere; 75 and 600 Ampere; and 80 and 500 Ampere.

48. (Original) The method of claim 47,

wherein a second maximum of the second pulse essentially corresponds to the first maximum.

49. (Previously Presented) The method of claim 39,

wherein a first duration of the first current pulse is longer than a second duration of the second current pulse.

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50. (Previously Presented) The method of claim 49,

wherein one of (I) the first duration is smaller than 300 ms and the second duration is larger than 300 ms; (ii) the first duration is smaller than 200 ms and the second duration is larger than 400 ms; and (iii) the first duration is between 20 to 150 ms and the second duration is between 180 to 700ms.

51. (Cancelled)

52. (Previously Presented) The method of claim 39,

wherein the first current pulse is applied using an electrode system having at least a first electrode and a second electrode; and

wherein the first electrode is located at the first location and the second electrode is located at the second location.

53. (Currently Amended) The ~~torque sensor~~ method of claim 52,

wherein each of the first electrodes has a plurality of electrode pins; and

wherein the plurality of electrode pins of each of the first and second electrodes are arranged in circumferentially around the sensor element such that the sensor element is contacted by the electrode pins of the first and second electrodes at a plurality of contact points at an outer circumferential surface of the shaft at the first and second locations.

54. (Previously Presented) The method of claim 39,

wherein at least one of the first current pulse and at least one of the second current pulse are applied to the sensor element such that the sensor element has a magnetically encoded region;

wherein, in a direction essentially perpendicular to a surface of the sensor element, the magnetically encoded region of the sensor element has a magnetic field structure such that there is a first magnetic flow in a first direction and a second magnetic flow in a second direction; and

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wherein the first direction is opposite to the second direction.

55-67. (Cancelled)

68. (Previously Presented) A method for magnetically encoding a sensor element for a torque sensor, comprising:

applying a first current pulse to sensor element;

wherein the first current pulse is applied in such a manner that there is a first current flow in a first direction along a longitudinal axis of the sensor element, ; and

wherein the first current pulse is such that the application of the current pulse generates a magnetically encoded region in the sensor element,

applying a second current pulse to the sensor element;

wherein the second current pulse is applied such that there is a second current flow in a second direction along the longitudinal axis of the sensor element.

wherein the first direction is opposite to the second direction.

69. (Previously Presented) A method for magnetically encoding a sensor element for a torque sensor, comprising:

applying a first current pulse to sensor element;

wherein the first current pulse is applied in such a manner that there is a first current flow in a first direction along a longitudinal axis of the sensor element, ; and

wherein the first current pulse is such that the application of the current pulse generates a magnetically encoded region in the sensor element,

wherein the sensor element has a circumferential surface surrounding a core region of the sensor element;

wherein the first current pulse is introduced into the sensor element at a first location at the circumferential surface such that there is the first current flow in the first direction in the core region of the sensor element;

wherein the first current pulse is discharged from the sensor element at a second location at the circumferential surface; and

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wherein the second location is at a distance in the first direction from the first location.

70. (Previously Presented) The method of claim 69,

wherein the second current pulse is introduced into the sensor element at the second location at the circumferential surface such that there is the second current flow in the second direction in the core region of the sensor element; and

wherein the second current pulse is discharged from the sensor element at the first location at the circumferential surface.

71. (Previously Presented) The method of claim 69,

wherein the sensor element is a shaft;

wherein the core region extends inside the shaft along its longitudinal extension such that the core region surrounds a center of the shaft;

wherein the circumferential surface is the outside surface of the shaft;

wherein the first and second locations are respective circumferential regions at the outside of the shaft.

72. (Previously Presented) The method of claim 69, further comprising:

providing a first pinning zone adjacent to the first location and a second pinning zone adjacent to the second location.

73. (Previously Presented) The method of claim 72, further comprising:

forming the first pinning zone by applying a third current pulse to the circumferential surface of the sensor element one of at the first location and adjacent to the first location, such that there is a third current flow in the second direction;

wherein the third current flow is discharged at a third location which is displaced from the first location in the second direction.

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74. (Previously Presented) The method of claim 73, further comprising:

forming the second pinning zone, one of at the second location and adjacent to the second location, by applying a forth current pulse on the circumferential surface to the sensor element such that there is a forth current flow in the first direction;

wherein the forth current flow is discharged at a forth location which is displaced from the second location in the first direction.

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